SIEMENS

Operating Instructions
POLYDOROS SX 65/80

AX

CE
0123

AX63-055.621.01.01.02

Please observe

Safety operating instructions

Order No.: RX0-000.621.01

These must be studied exactly before system startup.

Important information from the manufacturer

CE
0123

This product is provided with a CE marking in accordance with the regulations stated in Appendix II of the Directive 93/42/EC of June 14th, 1993 concerning medical products.

In accordance with Appendix IX of the Directive 93/42/EC, this product is assigned to class II b.

The CE marking applies only to medical products which have been put on the market according to the above-mentioned EC Directive.

Unauthorized changes to this product invalidate this declaration.

The original version of this manual was written in the German language.

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AX

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Application

POLYDOROS SX 65/80 is a high-frequency X-ray generator for all procedures in general diagnostic radiology.

The combination of microprocessor control and high-frequency converter technology ensures good X-ray images due to the high accuracy of the exposure data.

Configuration

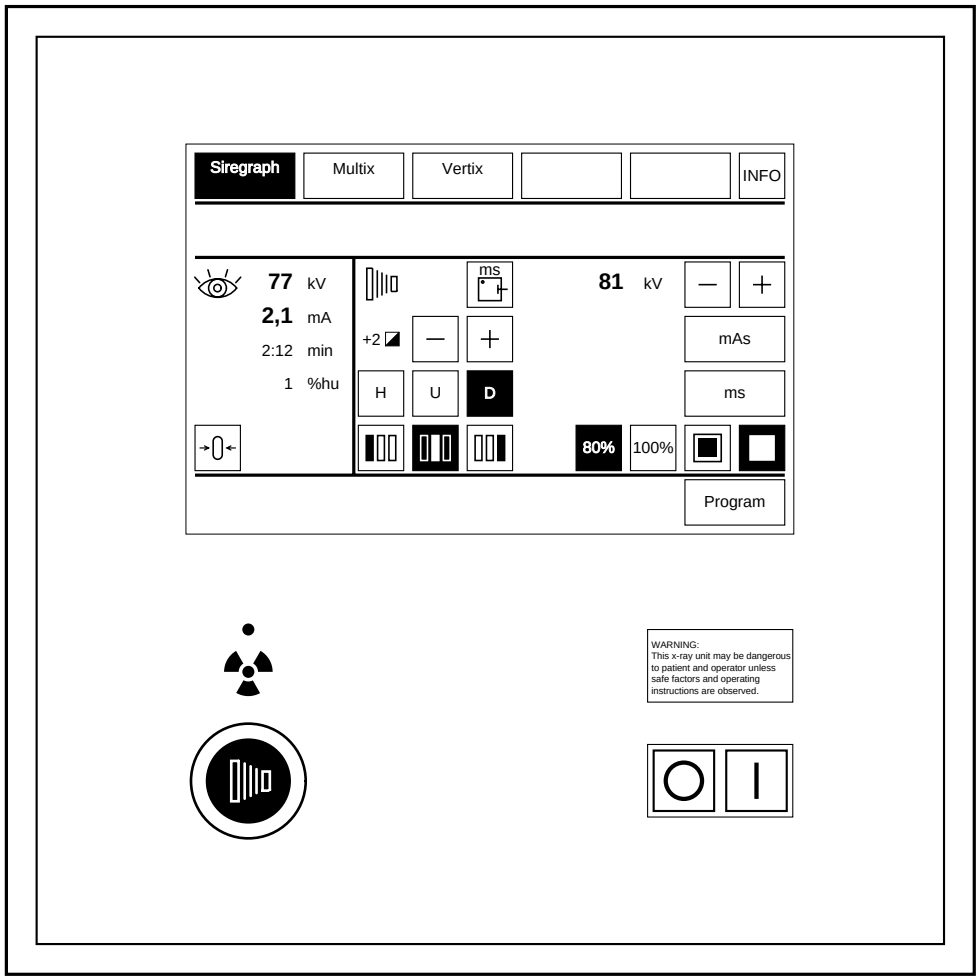
Basic version

- ❏ IONTOMAT PN automatic exposure control
- ❏ IONTOMAT PN automatic exposure control for tomography
- ❏ Tomographic device connection
- ❏ Polymatic incl. 0-point technique
- ❏ Programming unit for organ programs
- ❏ RS 232 printer connection
- ❏ Tube load computer

Options

- ❏ Connection for 3rd tube assembly

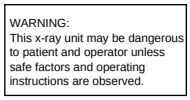
Overview of the controls and displays



Generator control console

General controls and displays

❑ Switching the system off/on


WARNING:
This x-ray unit may be dangerous to patient and operator unless safe factors and operating instructions are observed.

❑ Information regarding switching the system on:
WARNING:
This X-ray unit may be dangerous to patient and operator unless safe factors and operating instructions are observed.

❏ Exposure release button (two-stage)

❏ Symbol lights up when radiation is switched on

Menu

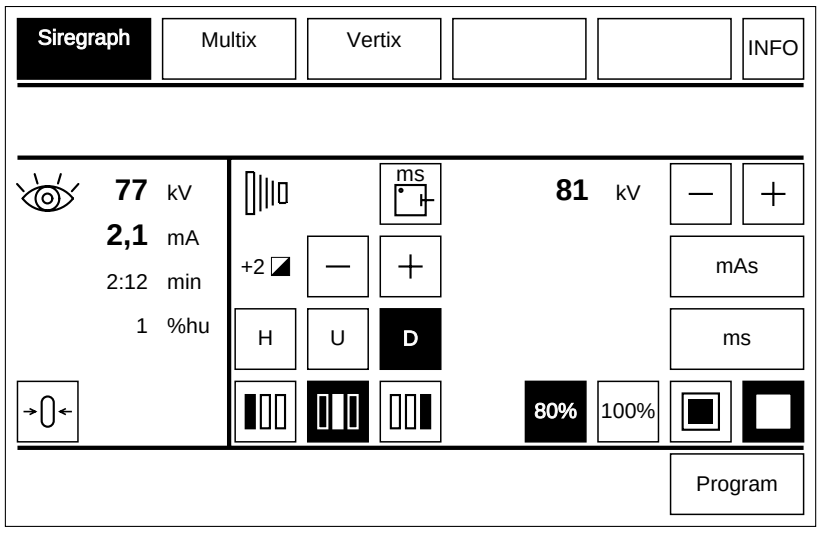
On the basis of the selected program or operating mode the permissible operating functions and operating data are indicated in menus on the control console.

Various menus are available depending on the program or operating mode:

❏ Data menu
  – Displays and controls for radiographic parameters

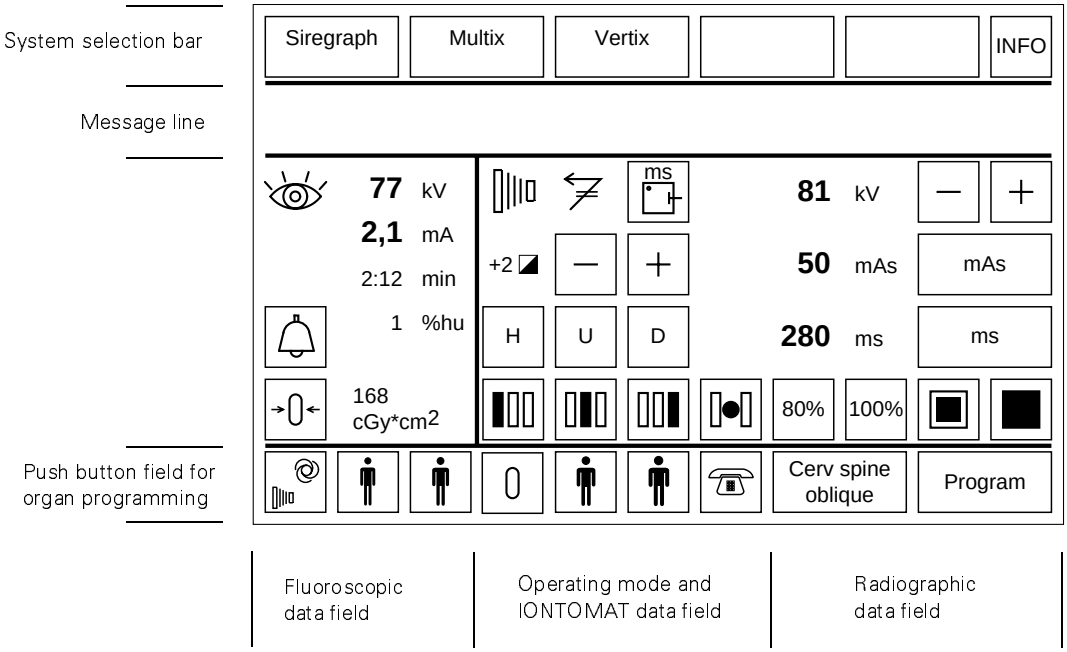
❏ Program menu
  – Display of organ programs

❏ Editing menu
  – Entry/modification of organ programs



Example: Data menu

Data menu



System selection bar

Siregraph

❏ System selection

INFO

❏ Button for displaying the load data of the selected X-ray tube

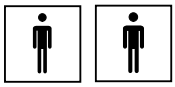
Message line

❏ Displays messages, warnings and buttons with specific functions

Push button field for organ programming

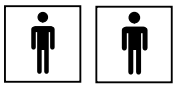
❏ Indicates 0-point technique selected/deselected

❏ Selection of the patient transparency
- only with selected organ program
- five alternatives are available



very thin, thin

normal



obese, very obese

❏ Indicates remote service

Cerv spine oblique

❏ Indicates the selected organ program

or

Remote A

❏ indicates the selected remote program

Program

❏ Switches over to the program menu

Fluoroscopic data field

❏ Fluoroscopic data field symbol

77 kV ❏ Indicates the fluoroscopic kV values

2.1 mA ❏ Indicates the fluoroscopic mA values

2: 12 min ❏ Indicates the fluoroscopic time

1 %hu ❏ Indicates the tube load

cGy*cm² ❏ Indicates the dose area product (optional)

❏ Resets the fluoroscopic warning signal

❏ Resets the fluoroscopic data (time, kV, mA) and the dose area product (cGy*cm²)

Operating mode and IONTOMAT data field

❏ Symbols indicate that:

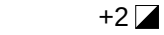
direct radiographic mode is active

or

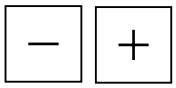
indirect radiography is active

❏ Indicates that tomographic mode is active

❏ Selects the IONTOMAT (with 3-point technique)

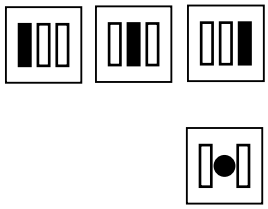


❏ Indicates the density compensation



❏ Adjusts the density compensation (+/- 4 exposure points)
- Active only with IONTOMAT selected

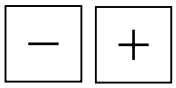
❏ Selects the film-screen combination
- H = high sensitivity
- U = medium sensitivity
- D = low sensitivity, high detail resolution



❏ Selects the measuring field (dominant) (left, center, right, circular)

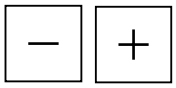
Radiographic data field

81 kV ❑ Indicates the tube voltage



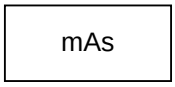
❑ Adjusts the kV value

50 mAs ❑ Indicates/post-indicates the mAs value



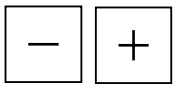
❑ Adjusts the mAs value

or



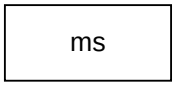
❑ Changes the exposure technique

280 ms ❑ Indicates/post-indicates the mAs value

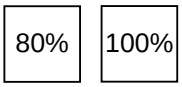


❑ Adjusts the mAs value

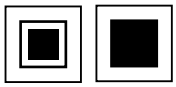
or



❑ Changes the exposure technique

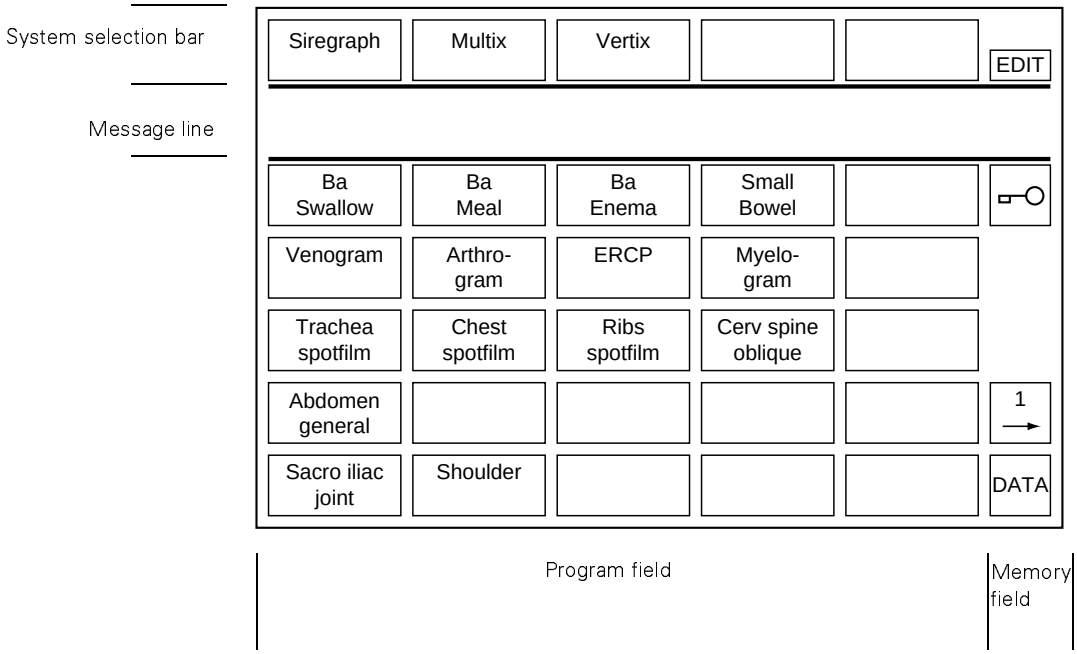


❑ Selects 80%/100% tube load



❑ Selects small/large focal spot

Program menu



System selection bar

Siregraph

❑ System selection
– e.g. Siregraph

EDIT

❑ Selects the editing display field

Message line

❑ Displays information on operation.

Program field

Cerv spine oblique

❑ Selects the organ program

Memory field

❑ Enables programming

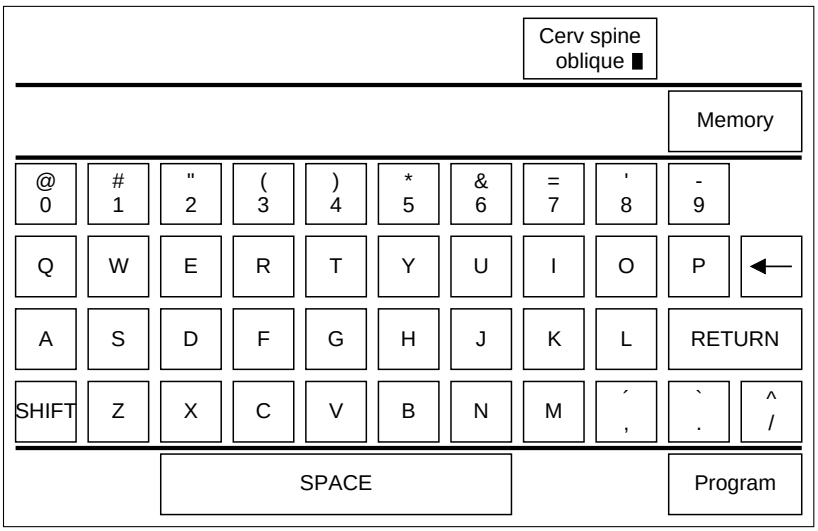
1 → 2 →

❑ Switches over to the 1st or 2nd program menu page (depending on unit)

DATA

❑ Switches over to the data menu

Editing menu



Cerv spine oblique

❏ Program name field
– For entry of the program name

❏ Backspace key
– Erases characters

RETURN

❏ RETURN key
– Starts a new line

SHIFT

❏ SHIFT key
– Shifts from lower case to upper case characters

SPACE

❏ SPACE key
– Inserts a blank

Memory

❏ Memory button
– Saves the program name

Explanation of displays and controls

Normal/inverted display of the controls

❑ Normal display
– Function deactivated

❑ Inverted display
– Function activated

Function of the +/- buttons

◆ Brief button actuation
– Value increases by one step

◆ Prolonged button actuation
– Value increases until the button is released

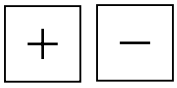
◆ Brief button actuation
– Value decreases by one step

◆ Prolonged button actuation
– Value decreases until the button is released

Flashing kV, ms, mAs displays

❑ All displays are flashing simultaneously
– System not operable, please observe instruction in the message line

❑ Some of the displays are flashing
– The preset value is too high, the automatic control adjusts to the closest permissible value



◆ Actuate the respective +/- button
– The new value is confirmed and the display stops flashing

Changing the focal spot and tube load

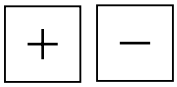
If the maximum acceptable load of the selected X-ray tube is exceeded when switching over

❑ from the large to the small focal spot or

❑ from 100% to 80% tube load

the generator automatically reduces the mAs setting.

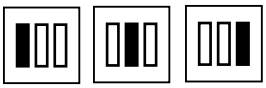
This is indicated by a flashing mAs display.



◆ Actuate the respective +/- button
  – The new value is confirmed and the display stops flashing

Selecting the measuring field (dominant)

The selection of more than one measuring field (dominant) is possible.



◆ To do this, actuate the buttons within one second

Measuring field (dominant) display

If either the left or the right dominant selected becomes invalid, e.g. due to collimation, the measuring field selected is then shown crossed out.

Indirect technique:

When the diaphragm is opened again, the previously selected dominants are shown normal again.

Direct exposure technique with automatic format collimation:

Only when the exposure release button is pressed up to the 1st pressure point, are the previously selected dominants shown normal again.

Screen saver

The touchscreen is equipped with a screen saver which reduces the brightness automatically after a preset interval.

When you touch a button on the screen again, the normal brightness is switched on again.

On/Off, emergency shutdown

Switching the generator on/off

◆ Press the button
  – The entire system is switched on
  – The data menu is displayed

The system is operable if

❑ No error message appears in the message line, and

❑ None of the displays (kV, mAs, ms) on the control console flashes

❑ Any system selection is active.

◆ Press the button
  – The entire system is switched off

Emergency shutdown

For the emergency shutdown button which is installed on site, observe the following:

In the case of danger for patients, operators or unit, immediately press the button for emergency shutdown. The entire system is thus disconnected from voltage and all movements are interrupted.

The emergency shutdown button may be enabled again only if the cause of danger has been clearly detected and removed. In all other cases, the SIEMENS Uptime Service must be notified.

Emergency power supply

When the system is operated with a stand-by generator, only analog fluoroscopy is possible.

Pulsed fluoroscopy, high-contrast fluoroscopy and any radiographic operating mode are not possible.

The following appears in the message line: “Emergency power supply active”.

Radiation disable function

To prevent accidental release of radiation, e.g. during cleaning, the radiation can be disabled by means of an external switch (installed on-site).

"X-ray disabled active"appears in the message line.

Messages

General error messages

Each time the generator is switched on, an automatic check of all important functions is made (test routine).

The generator is constantly monitored during radiographic operation.

Upon detection of a fault the generator is disabled, and a corresponding error message appears in the message line and is saved in the memory.

You can cancel the disable status as follows
- briefly press the exposure release button up to the 1st pressure point or
- briefly switch the generator off.

If the error message is still displayed, then there is an error in the generator. Please call the SIEMENS Uptime Service.

Exceeding the limit values

When reaching the time limit or the mAs limit an audible signal comes on and the limit button appears in the message line.

Then, the release of an exposure is no longer possible.

To continue the examination

LIMIT

◆ Actuate this button
- and the disable status of the generator is revoked.

Tube load computer

General

The tube load computer protects the connected X-ray tube assembly from overloading in radiographic mode.

From the selected exposure factors and from the physical and geometrical properties of the tube assembly it computes the length of the cooldown time that may be necessary.

Furthermore, the tube load computer stores all important operating data of the respective X-ray tube assembly.

The current load (%hu) is constantly displayed.

Pause time indication

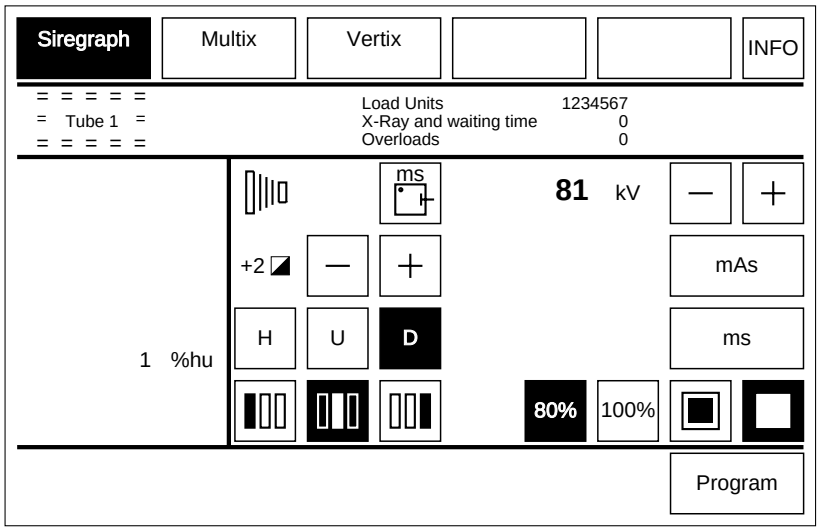
The cooldown time indicated in the message line must be observed to prevent overloading the tube assembly. The next exposure must not be released before this time has elapsed.

- ❏ X-ray tube assembly with no load
  - – No cooldown time required:
    You may release the preset exposure up to 100% tube load.
- ❏ X-ray tube assembly with little load
  - – No cooldown time required and automatic switching to 80% tube load.
    You may release the preset exposure with 80% tube load.
- ❏ X-ray tube assembly with heavy load
  - – Cooldown time is indicated[1]
    You may release the preset exposure with 80% tube load only after the indicated cooldown time has elapsed.

[1] If a warning buzzer is to come on at a certain pause time threshold please have it programmed by your customer service.

Load data indication

The load unit counter stores the load data of the connected X-ray tube assemblies.



INFO

With the INFO button pressed the load data of the selected X-ray tube assembly is indicated in the message line.

- Load Units (BE)
  - 1 load unit corresponds to 1 exposure or 1(2)s series or 7(15)s pulsed fluoroscopy (the values in brackets apply to the Megalix tube assembly)
- X-Ray and waiting time
  - Number of exposures released during the indicated cooldown time.
- Overloads
  - Number of overloads

INFO button is not active if an information is already present on the message line.

1 %hu Indication of the current value of the tube load in relation to the maximum heat storage capacity in per cent.

Functional and safety checks

Daily checks

After switching on

- Please make a visual inspection of the displays and signal lamps on the control console.

No error message may appear.

The radiation indicator on the control console or the radiation warning lights in the room must not light up.

Warning

If the radiation indicator or a radiation warning light lights up without actuating a switch

- immediately switch off the X-ray system through emergency shutdown and
- notify the SIEMENS Uptime Service.

During the examination

- Check the radiation indicator. It may light up only during the duration of the X-ray exposure.

Monthly checks

- Perform a functional check of the automatic exposure control, as described in the "Safety" operating instructions.

Legally required checks

Obtain information in the "Safety" operating instructions.

Maintenance intervals

Maintenance must be performed annually to maintain the safety and functioning of the generator.
If you have not concluded a maintenance contract, please notify the SIEMENS Uptime Service in good time.

Remote service

Thanks to the possible remote service offered, problems occurring with the system can be diagnosed directly at the customer site, without the need of any service call, and maintenance can be performed.

Access is made via modem and is only possible when the necessary "authorized access" has been provided by the user.

Possibilities of remote service

There are 3 remote service possibilities.

❑ Limited Access
- Remote service activities run in the background and are permitted only for a certain time.
- Patient examination can be continued.

❑ Limited Access Permanent
- Corresponds to Limited Access, however, permanent access is permitted as long as it is selected.

❑ Access Denied
- No remote service possible.

Indication of the stored remote service

◆ Press this button
- The stored remote service is indicated in the message line.

Selection of a remote service

◆ Press this button until the required remote service is displayed in the message line.
- The last displayed remote service is stored after 5 seconds.
- The button appears inverted in the case of authorized access.

Note in the message line: Setting stored.

Indication of the currently active remote service

A picked up phone receiver indicates that Siemens Service has established contact.

Fluoroscopy

System selection (unit)

Siregraph

◆ Select the required system (unit).

e.g. Siregraph

Releasing fluoroscopy

Fluoroscopy release takes place from the system control (fluoroscopy switch on the unit or via foot switch).

Selecting the fluoroscopic mode[1]

Fluoroscopy with automatic control

With the automatic stage buttons on the unit, select the required characteristic curve for the automatic dose rate control.

High-contrast fluoroscopy

Is a special case of fluoroscopy with automatic control. It is selected with the 2nd pressure point of a two-stage foot switch. The mode is indicated acoustically.

Fluoroscopic data

The kV, mA, time and dose area product (optional) for fluoroscopy are indicated on the control console.

Display of the kV and mA values

❑ During fluoroscopy:
  – the current kV and mA values are indicated continuously

❑ After the end of fluoroscopy:
  – the mean value of kV and mA for the examination

[1] depending on the system configuration

Display of the fluoroscopic time

Continuous display of cumulative time in minutes during the examination

Display of the dose area product (optional)

Continuous display of the dose area product accumulated in the examination.

Resetting the fluoroscopic data

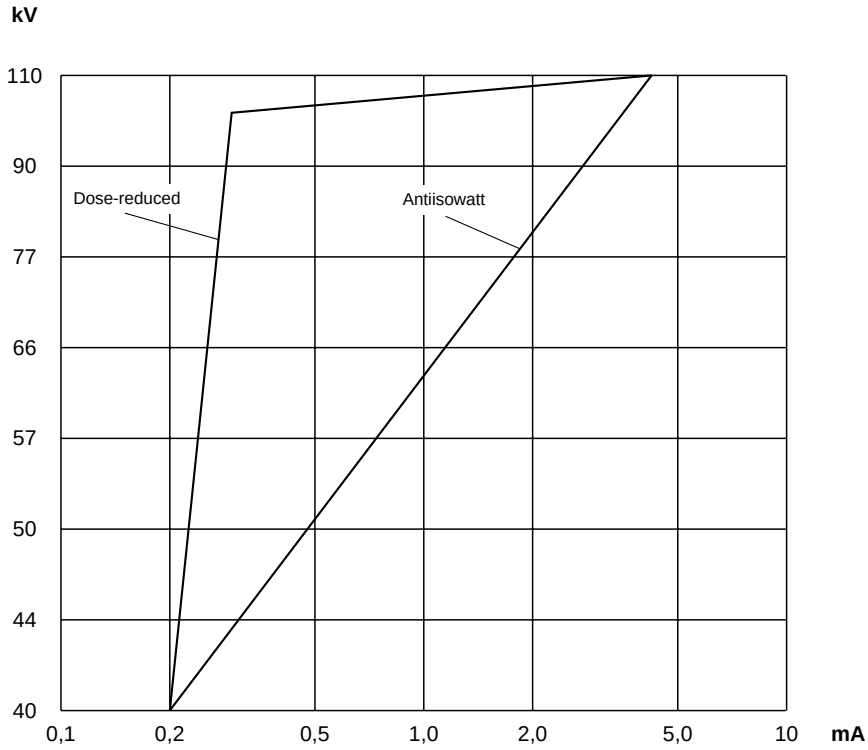
When the examination is finished, record the fluoroscopic data displayed and

- press the Reset button.
  - The displays for the fluoroscopic data and for the dose area product are reset to zero.

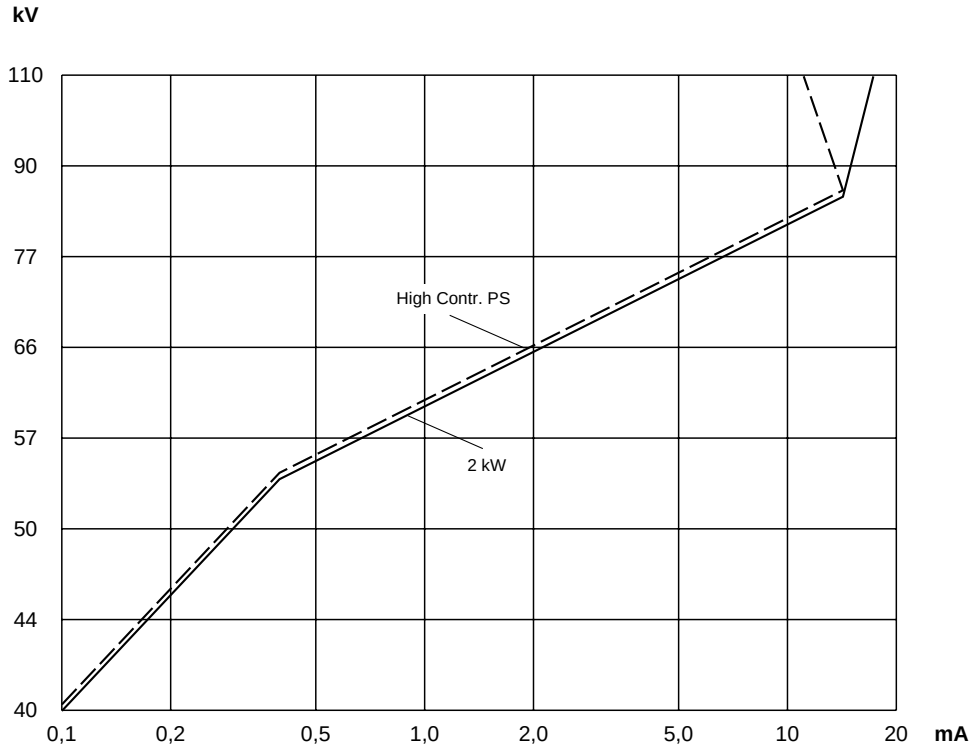
Fluoroscopic characteristic curves

For fluoroscopy you can choose between several fluoroscopic curves, which you can program depending on the system configuration.

Characteristic curve examples for normal fluoroscopy



Characteristic curve examples for high-contrast fluoroscopy



Fluoroscopic time limit

After a fluoroscopic time of 10 minutes[1], fluoroscopy switches off automatically and cannot be switched on again.

To continue working,

◆ let go of the fluoroscopy switch and actuate it again.

Fluoroscopic warning signal

After a fluoroscopic time of max. 5 minutes[2], an acoustic signal sounds.

◆ By pressing the button, the acoustic signal is switched off.
  – The time for the acoustic signal can be reset at any time.

[1] At the wish of the customer, this parameter can be changed by SIEMENS Uptime Service, in accordance with country-specific regulations.
[2] Can be configured from 1 to 5 minutes by SIEMENS Uptime Service.

Exposure technique

Selecting the system (unit)

Siregraph

◆ Select the required system (unit).

e.g. Siregraph

Exposure release

You can release the exposure independent of the system configuration either with the release button on the generator control console or by the system operation.

Check the selected exposure data on the generator control console before every radiation release.

You can release an exposure if

❑ no error message appears in the message line, and

❑ none of the displays (kV, mAs, ms) on the control console flashes

Preparation:

◆ Press the exposure release button down to the 1st pressure point
  – the rotating anode is accelerated to nominal speed
  – the required filament current is set

After the X-ray tube assembly has heated up and the rotating anode has run up to speed, the exposure can be released selectively.

Radiation release:

◆ Press the release button completely through and keep it held until the exposure is ended.

Letting go of the release button immediately ends the exposure and the exposure can then be underexposed.

The radiation indicator on the control console lights up and a signal sounds during the exposure release.
Let go of the release button immediately after the radiation indicator goes out. In this way you conserve the X-ray tube assembly.

❑ Observe the following to increase the life of the tube assembly:
- If possible always select 80% tube load at the generator.
- It is essential that you program 80% tube load in the programs with small focal spot and a tube voltage less than 70 kV.
- Work with the large focal spot below 70 kV tube voltage, if possible.
- Keep the prep time short and possibly “push through” to keep this time short.
- Let go of the exposure release button immediately after the exposure.

The above instructions should be observed especially at workstations with high patient throughput (accident stations) to counteract premature wear of the X-ray tube assembly.

Automatic exposure system "0-point technique"

General

- ❑ 0-point technique presupposes fluoroscopy; it is therefore expedient only for spotfilming.
- ❑ The following exposure parameters are determined and set automatically for direct and indirect technique:

Direct technique:	Indirect technique:
Exposure kV Exposure mA	Exposure kV Exposure mA Focal spot

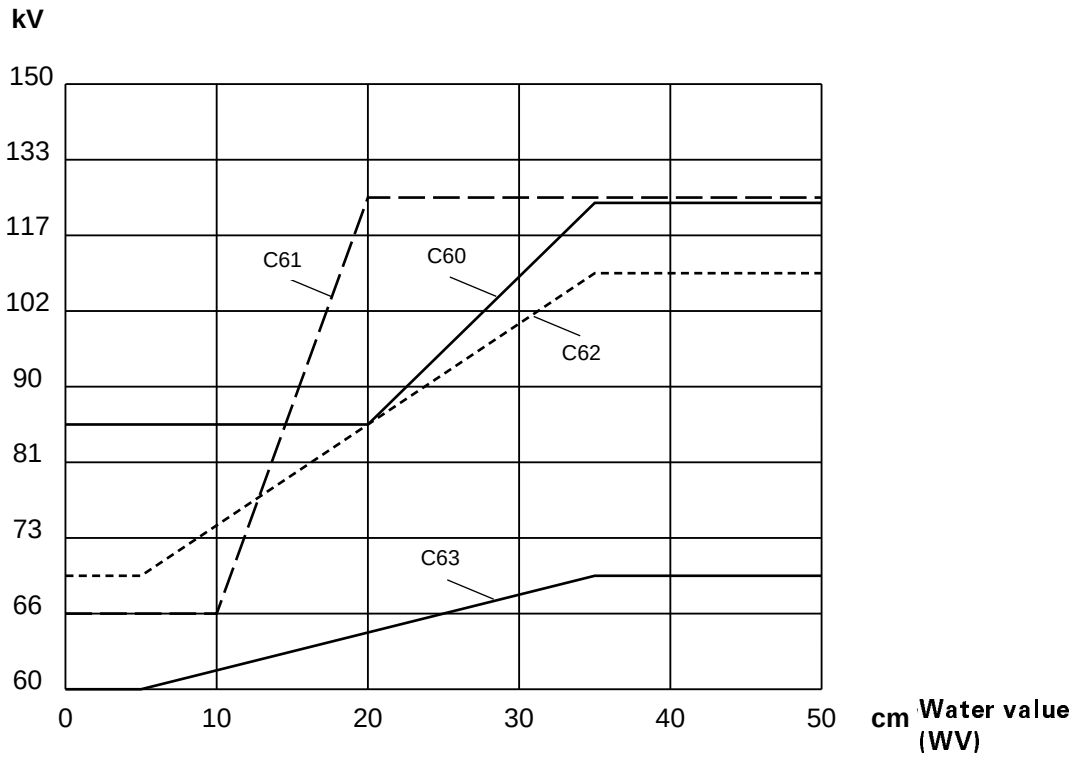
Programmed characteristic curves

- ❑ Several characteristic curves, which you can program depending on the system configuration, are available to you for the exposure.
- ❑ Programmed characteristic curves in the curve stock

No.	Type of curve	Voltage
C1	Plateau whole EP	40.0 kV
C2	Plateau whole EP	41.0 kV
C3	Plateau whole EP	42.0 kV
C4	Plateau whole EP	44.0 kV
C5	Plateau whole EP	46.0 kV
C6	Plateau whole EP	48.0 kV
C7	Plateau whole EP	50.0 kV
C8	Plateau whole EP	52.0 kV
C9	Plateau whole EP	55.0 kV
C10	Plateau whole EP	57.0 kV
C11	Plateau whole EP	60.0 kV
C12	Plateau whole EP	63.0 kV
C13	Plateau whole EP	66.0 kV
C14	Plateau whole EP	70.0 kV
C15	Plateau whole EP	73.0 kV
C16	Plateau whole EP	77.0 kV
C17	Plateau whole EP	81.0 kV
C18	Plateau whole EP	85.0 kV
C19	Plateau whole EP	90.0 kV
C20	Plateau whole EP	96.0 kV

No.	Type of curve	Voltage
C21	Plateau whole EP	102.0 kV
C22	Plateau whole EP	109.0 kV
C23	Plateau whole EP	117.0 kV
C24	Plateau whole EP	125.0 kV
C25	Plateau whole EP	133.0 kV
C26	Plateau whole EP	141.0 kV
C27	Plateau whole EP	150.0 kV
C28	Plateau	68.0 kV
C29	Calibration curve	
C30	Plateau	68.0 kV
C31	Plateau half EP	40.5 kV
C32	Plateau half EP	51.5 kV
C33	Plateau half EP	43.0 kV
C34	Plateau half EP	45.0 kV
C35	Plateau half EP	47.0 kV
C36	Plateau half EP	49.0 kV
C37	Plateau half EP	51.0 kV
C38	Plateau half EP	53.5 kV
C39	Plateau half EP	56.0 kV
C40	Plateau half EP	58.5 kV
C41	Plateau half EP	61.5 kV
C42	Plateau half EP	64.5 kV
C43	Plateau half EP	68.0 kV
C44	Plateau half EP	71.5 kV
C45	Plateau half EP	75.0 kV
C46	Plateau half EP	79.0 kV
C47	Plateau half EP	83.0 kV
C48	Plateau half EP	87.5 kV
C49	Plateau half EP	93.0 kV
C50	Plateau half EP	99.0 kV
C51	Plateau half EP	105.0 kV
C52	Plateau half EP	113.0 kV
C53	Plateau half EP	121.0 kV
C54	Plateau half EP	129.0 kV
C55	Plateau half EP	137.0 kV
C56	Plateau half EP	145.0 kV
C57	Plateau	68.0 kV
C58	Plateau	68.0 kV
C59	Plateau	68.0 kV
C60	See graph	

No.	Type of curve	Voltage
C61	See graph	
C62	See graph	
C63	See graph	
C64	Plateau	68.0 kV
C65	Plateau	68.0 kV
C66	Plateau	68.0 kV
C67	Plateau	68.0 kV
C68	Plateau	68.0 kV
C69	Plateau	68.0 kV
C70	See graph	
C71	Reserve	
C72	Plateau	87.5 kV
C73	Reserve	
C74	Reserve	
C75	Reserve	
C76	Reserve	
C77	Plateau	68.0 kV
C78	Plateau	68.0 kV
C79	Plateau	68.0 kV
C80	Plateau	68.0 kV
C81	Plateau	68.0 kV
C82	Plateau	68.0 kV
C83	Plateau	68.0 kV
C84	Plateau	68.0 kV
C85	Plateau	68.0 kV
C86	Plateau	68.0 kV
C87	Plateau	68.0 kV
C88	Plateau	68.0 kV
C89	Plateau	68.0 kV
C90	Plateau	68.0 kV
C91	Plateau	68.0 kV
C92	Plateau	68.0 kV
C93	Plateau	68.0 kV
C94	Plateau	68.0 kV
C95	Plateau	68.0 kV
C96	Plateau	68.0 kV
C97	Plateau	68.0 kV
C98	Plateau	68.0 kV
C99	Plateau	68.0 kV
C100	Plateau	77.0 kV



❑ Recommended characteristic curves for organ programs in 0-point technique
– These suggestions correspond to the SIEMENS basic exposure table, whereby only the part relevant for the 0-point technique has been listed.

Organ	kV	Characteristic curve
Cranium:		
Survey of cranium p.-a., a.-p	70	C 14
Cranium lateral	66	C 13
Cranium axial	85	C 18
Petrosal bones sagittal	70	C 15
Petrosal bones Stenvers	70	C 14
Paranasal sinuses p.-a.	70	C 14
Optical nerve cavity Rhese	66	C 13

Organ	kV	Characteristic curve
Thorax:		
1st-7th rib p.-a., a.-p.	66	C 13
8th-12th rib p.-a., a.-p.	70	C 14
Sternum p.-a.	63	C 12
Sternum lateral	66	C 13
Clavicle p.-a.	60	C 11
Scapula a.-p.	63	C 12
Scapula lateral	63	C 12
Thorax		C 61
Lungs, heart lateral	125	C 24 or C 61
Esophagus oblique	90	C 19 or C 60
Esophagus/deglutition		C 62
Abdomen:		
Kidneys, gallbladder a.-p.	66	C 13 or C 63
Kidneys, gallbladder lateral	81	C 17 or C 63
Bladder a.-p.	66	C 13
Bladder axial	70	C 14
Stomach, duodenal bulb, GI tract survey	102	C 21 or C60 or C62
Gastrointestinal tract		C 60
Colon contrast study		C 60, C 62
Spinal column:		
1st to 3rd cervical vertebrae oral	70	C 14
4th to 7th cervical vertebrae a.-p.	70	C 14
1st to 7th cervical vertebrae lateral	70	C 14
1st to 7th cervical vertebrae oblique	70	C 14
Thoracic vertebrae oblique	81	C 17
Thoracic vertebrae a.-p.	73	C 15
Thoracic vertebrae lateral	81	C 17
1st to 4th lumbar vertebrae a.-p.	77	C 16
1st to 4th lumbar vertebrae lateral	90	C 19
1st to 4th lumbar vertebrae oblique	81	C 17
5th lumbar vertebra a.-p.	77	C 16
5th lumbar vertebra lateral	90	C 19
Pelvis, hip	73	C 15
Sacrum, coccyx a.-p.	73	C 15
Sacrum, coccyx lateral	90	C 19
Arms:		
Shoulder joint a.-p.	63	C 12
Shoulder joint axial	60	C 11
Legs:		
Femur upper	70	C 14
Femur lower	60	C 11
Knee a.-p.	60	C 11
Knee lateral	60	C 11

Adapting the patient transparency

❑ You can adapt the values of kV, mAs and film density of the selected organ program with the following buttons.

❑ This adaptation ends when you exit the organ program.

	IONTOMAT mode[a]	mAs mode[b]
	Change kV by + 4 EP[c]	Change mAs by + 4 EP
	Change kV by + 2 EP	Change mAs by + 2 EP
	No kV change	No mAs change
	Change kV by - 2 EP	Change mAs by - 2 EP
	Change kV by - 4 EP	Change mAs by - 4 EP

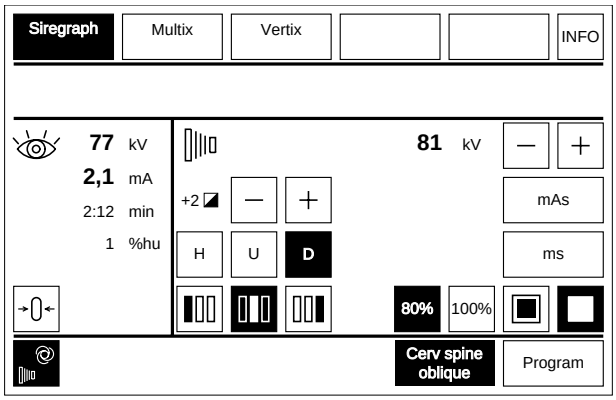
a.or programmable: kV and density compensation
b.or programmable: kV and mAs
c.EP = 1 exposure point

Selecting direct exposure technique

Select 0-point technique

❑ Setting the kV value from fluoroscopy

❑ Exposure cut-off by the automatic exposure control.



Selection

With organ program:

◆ Select an organ program with 0-point technique

Deselection

◆ Actuate
- the mAs button: 2-point technique is selected or
- the ms button: 3-point technique is selected

With organ program:

◆ Select an organ program without 0-point technique

Exposure data to be set

❑ The following exposure data can be set:
- Focal spot
- Tube load
- Measuring fields (dominants)
- Film-screen combination
- Density compensation
- Patient transparency in program technique (organ program)

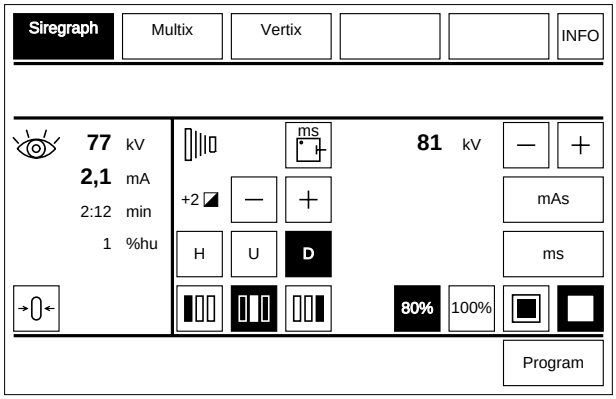
Display of the exposure data

❑ After the end of the exposure, the mAs and ms values in the display are flashing.

Select 1-point technique

❑ Setting the kV value

❑ Exposure cut-off by automatic exposure control.



Selection

◆ Press
- a button for film-screen combination or
- a measuring field (dominant) button

With organ program:

◆ Select an organ program with 1-point technique

Deselection

◆ Press
- the mAs button: 2-point technique is selected or
- the ms button: 3-point technique is selected or
- the IONTOMAT button: 3-point technique with IONTOMAT is selected

With organ program:

◆ Select an organ program without 1-point technique

Exposure data to be set

❑ The following exposure data can be set:
- kV value
- Focal spot
- Tube load
- Measuring fields (dominants)
- Film-screen combination
- Film density compensation
- Patient transparency in program technique (organ program)

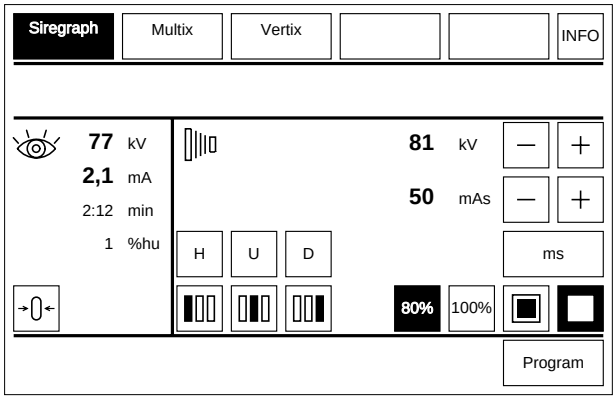
Display of exposure data

❑ After the end of the exposure, the mAs and ms values in the display are flashing.

Select 2-point technique

❑ Setting the kV and mAs value

❑ Exposure cut-off by the mAs counter.



Selection

◆ Actuate the mAs button

With organ program:

◆ Select an organ program with 2-point technique

Deselection

◆ Press
- a button for film-screen combination: 1-point technique is selected or
- a measuring field (dominant) button: 1-point technique is selected or
- the ms button: 3-point technique is selected

With organ program:

◆ Select an organ program without 2-point technique

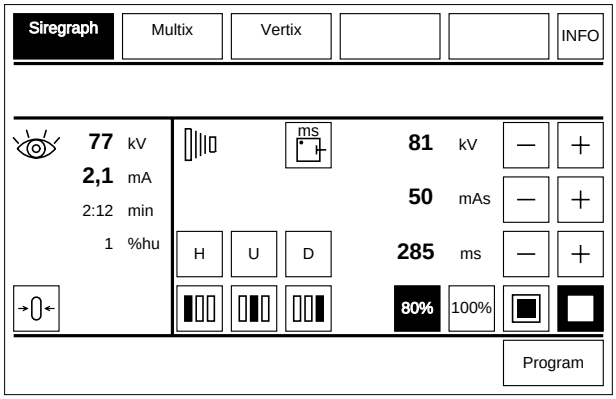
Exposure data to be set

❑ The following exposure data can be set:
- kV value
- mAs value
- Focal spot
- Tube load
- Patient transparency in program technique (organ program)

Select 3-point technique

❑ Setting the kV, mAs and ms value

❑ Exposure cut-off by the mAs counter.



Selection

◆ Actuate the ms button

With organ program:

◆ Select an organ program with 3-point technique

Deselection

◆ Press
- a button for film-screen combination: 1-point technique is selected or
- a measuring field (dominant) button: 1-point technique is selected or
- a button for mAs setting: 2-point technique is selected or
- the IONTOMAT button: 3-point technique with IONTOMAT is selected

With organ program:

◆ Select an organ program without 3-point technique

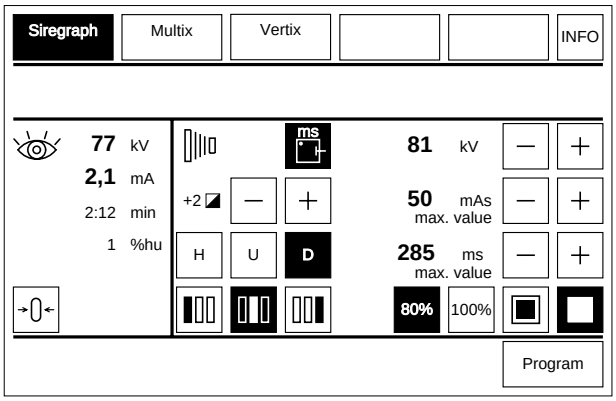
Exposure data to be set

❑ The following exposure data can be set:
- kV value
- mAs value
- ms value
- Focal spot
- Tube load
- Patient transparency in program technique (organ program)

Select 3-point technique with IONTOMAT

❑ Setting the kV value and the maximum mAs and ms values

❑ Exposure cut-off by the automatic exposure control.



Selection

◆ Press the IONTOMAT button

With organ program:

◆ Select an organ program for 3-point technique with IONTOMAT

Deselection

◆ Press
- the IONTOMAT button: 1-point technique is selected

With organ program:

◆ Select an organ program without 3-point technique with IONTOMAT

Exposure data to be set

❑ The following exposure data can be set:
- kV value
- mAs value
- ms value
- Focal spot
- Tube load
- Measuring fields (dominants)
- Film-screen combination
- Film density compensation
- Patient transparency in program technique (organ program)

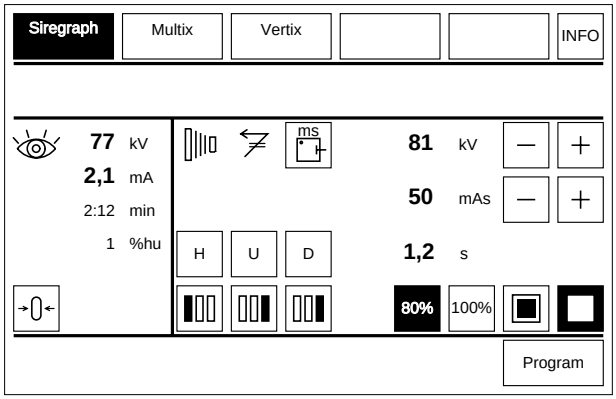
Display of exposure data

❑ After the end of the exposure, the mAs and ms values in the display are flashing.

Select mAs tomography

❑ Setting the kV, mAs values and the tomographic time

❑ Exposure cut-off by the mAs counter.



Selection

◆ Select a tomographic program on the unit
  – the tomography symbol lights up on the generator control console

Deselection

◆ Deselect the tomographic program on the unit or

◆ Press
  – a button for film-screen combination: Plani-IONTOMAT is selected or
  – a measuring field (dominant) button: Plani-IONTOMAT is selected or
  – the IONTOMAT button: Plani-IONTOMAT with mAs preselection is selected

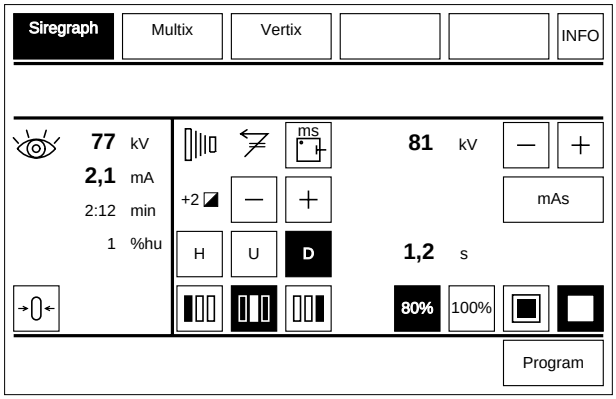
Exposure data to be set

❑ The following exposure data can be set:
  – kV value
  – mAs value
  – Focal spot
  – Tube load
  – Patient transparency in program technique (organ program)

Select tomography with Plani-IONTOMAT

❑ Setting the kV value and the tomographic time

❑ Exposure cut-off by the timer.



Selection

◆ Select
- a tomographic program on the unit and an organ program with Plani-IONTOMAT or
- a tomographic program on the unit and press a button for film-screen combination or a measuring field (dominant) button

The tomographic symbol lights up on the generator console

Deselection

◆ Deselect the tomographic program on the unit or

◆ press
- the mAs button: mAs tomography is selected or
- the IONTOMAT button: Plani-IONTOMAT with mAs preselection is selected

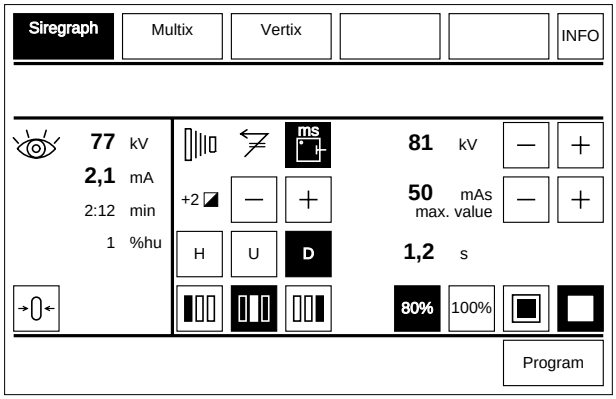
Exposure data to be set

❑ The following exposure data can be set:
- kV value
- Focal spot
- Tube load
- Measuring fields (dominants)
- Film-screen combination
- Density compensation
- Patient transparency in program technique (organ program)

Select tomography with Plani-IONTOMAT and mAs preselection

❑ Setting the kV and mAs value and the tomographic time

❑ Exposure cut-off by the timer.



Selection

◆ Select
- a tomographic program on the unit and an organ program with Plani-IONTOMAT and mAs preselection or
- a tomographic program on the unit and press the IONTOMAT button

The tomographic symbol lights up on the generator console

Deselection

◆ Deselect the tomographic program on the unit or

◆ press
- the IONTOMAT button: Plani-IONTOMAT is selected

Exposure data to be set

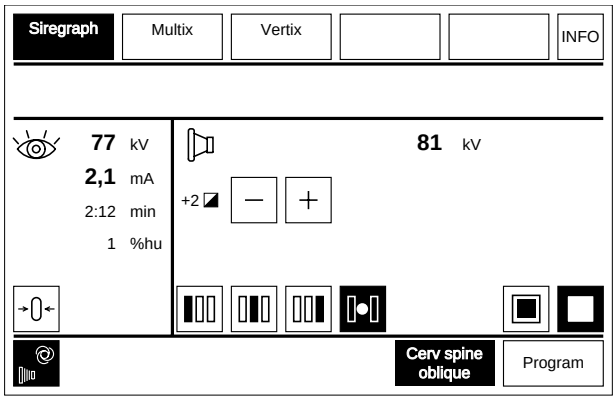
❑ The following exposure data can be set:
- kV value
- Focal spot
- Tube load
- Measuring fields (dominants)
- Film-screen combination
- Density compensation
- Patient transparency in program technique (organ program)

Select indirect exposure technique

Select DR 0-point technique

❏ Setting the kV value from fluoroscopy

❏ Exposure cut-off by the automatic exposure control.



Selection

◆ Select DR technique on the unit and an organ program with DR 0-point technique

Deselection

◆ Select an organ program without DR 0-point technique

Exposure data to be set

❏ Density compensation

❏ Measuring fields (dominants)

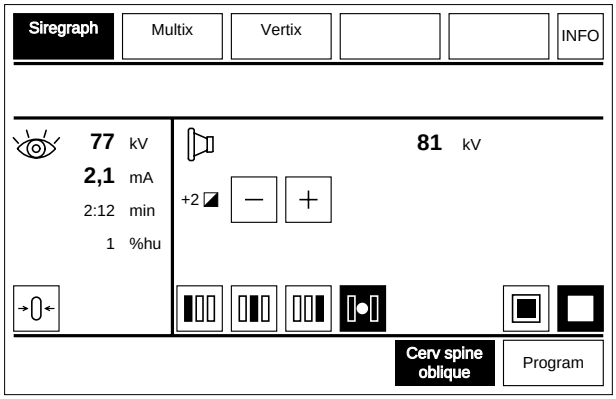
Display of exposure data

❏ After the end of the exposure, the mAs and ms values in the display are flashing.

Select DR 1-point technique

❑ Setting the kV value

❑ Exposure cut-off by the automatic exposure control.



Selection

◆ Select DR technique on the unit and an organ program with DR 1-point technique

Deselection

◆ Select an organ program without DR 1-point technique

Exposure data to be set

❑ Density compensation

❑ Measuring fields (dominants)

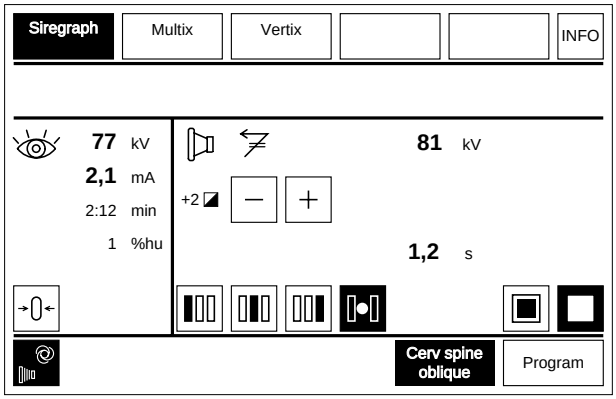
Display of exposure data

❑ After the end of the exposure, the mAs and ms values in the display are flashing.

Select DR tomography with Plani-IONTOMAT

❑ Setting the kV value and the tomographic time

❑ Exposure cut-off by the timer.



Selection

◆ Select DR technique and a tomographic program on the unit
– The tomographic symbol lights up on the generator

Deselection

◆ Deselect the tomographic program on the unit

Exposure data to be set

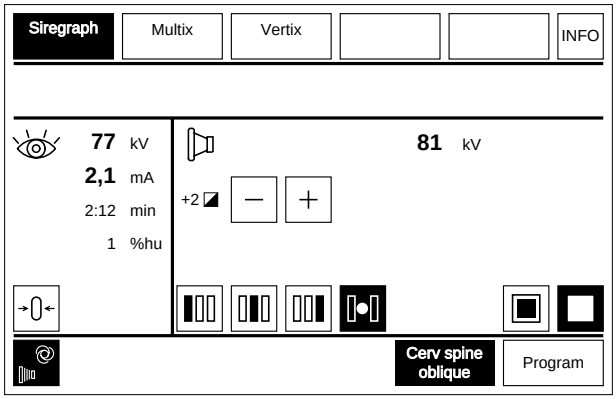
❑ Density compensation

❑ Measuring fields (dominants)

Select DSA constant time

❑ Setting a constant exposure time

❑ Exposure cut-off by the timer.



Selection

◆ Select DR technique on the unit and an organ program with DSA constant time technique

Deselection

◆ Select an organ program without DSA constant time technique

Exposure data to be set

❑ Density compensation

❑ Measuring fields (dominants)

Organ programs

❑ A certain number of organ programs has been stored during the initial start-up of your system.

❑ As a maximum, 25 organ programs per unit or in units with digital image system 50 organ programs can be generated and stored.

❑ For DR tomography, tomography and Peristepping/Perivision, 25 organ programs can additionally be generated and stored in each case.

❑ At any time you can tailor these organ programs to your personal needs or generate and store new organ program.
If desired, this can also be done by the SIEMENS Uptime Service.

Selecting an organ program

Program

◆ Actuate the program button in the data menu
– the program menu appears

Cerv spine oblique

◆ Select an organ program
– after the selection the system returns to the data menu
– the selected organ program appears inverted

Organ program data indication

❑ All data stored for the selected organ program are indicated in the data menu.

Editing organ program data

❑ The exposure data of any organ program can be edited. However, you have to distinguish between the temporary change and the permanent storage of a program.

❑ Organ programs are changed in
- direct technique on the generator control console
- DR technique on the digital image system

❑ Remote programs are changed analogously, only the remote program to be changed must be selected at the unit.

Temporary change

◆ Select the organ program

◆ Depending on the activated exposure technique the following exposure data can be edited:
- kV value
- mAs value
- ms value
- Focal spot
- Tube load
- Measuring fields (dominants)
- Film-screen combination
- Density compensation
- Patient transparency in program technique (organ program)

In the data menu the selected organ program is displayed non-inverted.

The edited parameters are in effect only until you select another organ program or switch the system off.

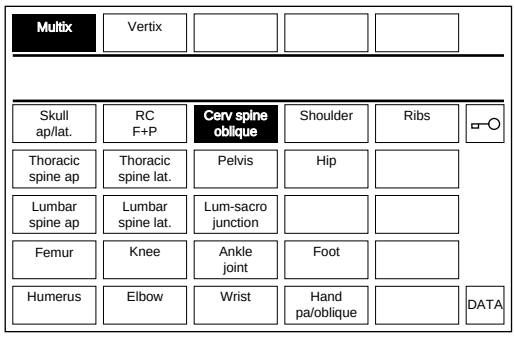
Permanent storage

Multix

◆ Actuate the required system selection button.

Program

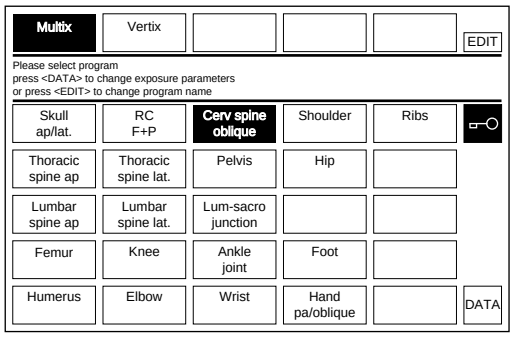
◆ Actuate the program button in the data menu
  – the program menu appears



◆ Press the key-symbol button
  – the key appears inverted
  – the program menu for programming mode is displayed

Cerv spine oblique

◆ Select an organ program
  – the button appears inverted

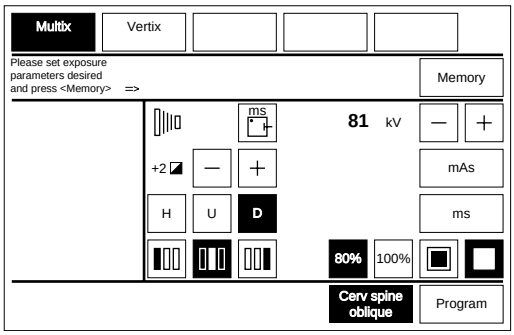


Note in the message line

Please select program
press <DATA> to change exposure parameters
or press <EDIT> to change program name.

DATA

◆ Actuate the data button
  – the data menu for programming mode appears



Note in the message line

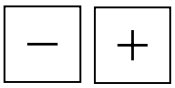
Please set exposure parameters desired and press <Memory>.

◆ Enter the desired exposure data according to the selected exposure technique:
  – kV value
  – mAs value
  – ms value
  – Tube load
  – Focal spot
  – Film-screen combination
  – Measuring fields (dominants)
  – Density compensation
  – Iontomat

additionally in 0-point technique

◆ Select the required characteristic curve from the stock of curves.

◆ Select a curve by pressing one of the buttons in the message line.



Selection of the next lower curve with the - button
Selection of the next higher curve with the + button

◆ Press the 0-point technique button

Memory

◆ Press the memory button
  – Storage is confirmed by a prolonged acknowledgement tone
  – The program menu appears

Now you can edit other organ programs

◆ Following completion of the changes, press the key-symbol button in the program menu for the programming mode.
  – Programming is now terminated and the edited programs are stored.

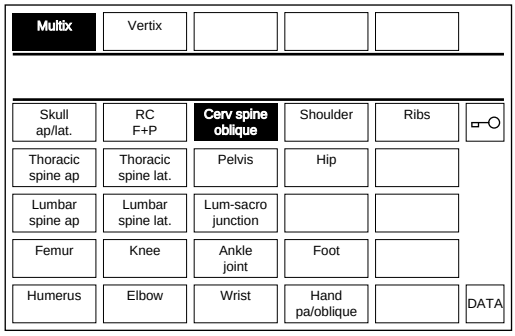
Editing organ program names

Multix

◆ Actuate the desired system selection button

Program

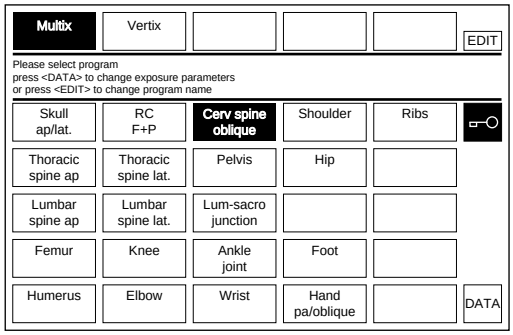
◆ Actuate the program button in the data menu
  – The program menu appears



◆ Press the key-symbol button
  – The button appears inverted
  – The program menu for the programming mode appears

Cerv spine oblique

◆ Select an organ program
  – The button appears inverted

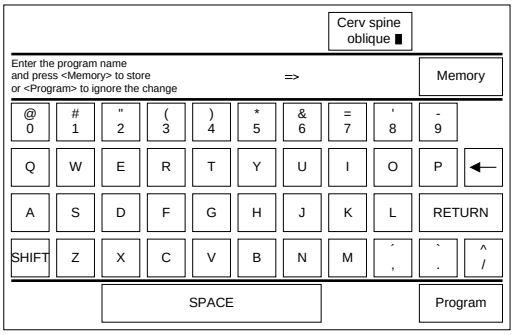


Note in the message line

Please select program
press <DATA> to change exposure parameters
or press <EDIT> to change program name.

EDIT

◆ Actuate the EDIT button
  – The editor menu appears



Note in the message line

Enter the program name and press <Memory> to store or <Program> to ignore the change.

◆ Type the name of the organ as it is to appear on the button
  – Allowed is a maximum of two lines of 10 characters each

Using the editor menu

Cerv spine oblique

❑ Cursor in the program name field
  – The cursor always indicates the position of the next character you enter

❑ Backspace key
  – Erases the character to the left of the cursor

RETURN

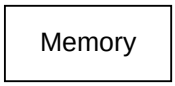
❑ RETURN key
  – Moves the cursor to the start of the second line

SHIFT

❑ SHIFT key
  – Shifts to upper case characters (letters or symbols marked at the top of the key).
  – The pressed SHIFT key appears inverted.

SPACE

❑ SPACE key
  – Enters a blank in the program name field.



◆ Actuate the memory button
  – Data storage is confirmed by a prolonged acknowledgement tone
  – The program menu appears

Pressing the program button takes you back to the program menu without storing the name of the organ program.

Now you can edit additional organ programs.

◆ Following completion of the changes, press the key-symbol button in the program menu for the programming mode.
  – Programming is now terminated and the edited program names are stored.

Technical data

All technical data show typical values if specific tolerances are not stated.

Line connection

Nominal voltage/ line frequency	400 V +/- 10%, 50/60 Hz three-phase (440/480 V +/- 10%,50/60 Hz three-phase via internal line-matching transformer, expansion)
Internal line resistance	POLYDOROS SX 65: 0.15 ohms (400 V) 0.18 ohms (440 V) 0.22 ohms (480 V) POLYDOROS SX 80: 0.10 ohms (400 V) 0.14 ohms (440 V) 0.16 ohms (480 V)
Nominal load	at 400 V: 34.6 kVA at 440 V: 38.0 kVA at 480 V: 41.5 kVA
Radio interference suppression/EMC:	EN 60 601-1-2
Type of protection:	Protective class I, according to IEC 601 - 1
Degree of protection:	IP 20 according to IEC 529
Ambient conditions (operation)	Temperature range + 10°C to + 40°C Rel. humidity: 20% to 75%, not condensing Atmospheric pressure: 70 kPa to 106 kPa
Weight	Maximum expansion: 290 kg Control console: 2.5 kg Control console with base: 29.5 kg

High-voltage waveform	Multipulse
Output	POLYDOROS SX 65: 800 mA at 81 kV 650 mA at 100 kV (according to IEC 601) 430 mA at 150 kV POLYDOROS SX 80: 980 mA at 81 kV 800 mA at 100 kV (according to IEC 601) 530 mA at 150 kV
Fluoroscopy	Working range: Normal fluoroscopy: from 40kV/0.2mA to 110kV/4.1mA High-contrast fluoroscopy: from 40kV/0.2mA to 110kV/18mA maximum of 4 FLUO curves can be configured
Tube voltage	53 values from 40 to 150 kV In steps of half Siemens exposure points (EP) or 1 EP (configurable)
Automatic system	0-,1- point technique with continuously falling load 2-, 3- point technique with constant load 3- point technique (with IONTOMAT PL) with constant load
mAs integrator	65 values from 0.5 mAs to 800 mAs In steps of half Siemens exposure points (EP) or 1 EP (configurable)
Switching time	1- point technique: 1 ms to 5 s with mAs and time postindication 2- point technique: 2 ms to 5 s depending upon kW, mAs and kV 3- point technique: 20 ms to 5 s depending upon kW, mAs and kV in 49 steps In steps of half Siemens exposure points
Tube assembly connection	2 Siemens double-focus tube assemblies
Number of workstations	max. 5
Automatic exposure control	IONTOMAT PN with 6 measuring inputs for measuring chambers as well as multiplier connection (option) or photodiode array (PDA)
Tolerances	kV accuracy +/- 5% mAs accuracy +/- 5% or +/- 0.5 mAs, depending on which value is higher. mA accuracy +/- 5% or +/- 0.1 mA in fluoroscopy, depending on which value is higher mA accuracy +/- 10% in radiography